

Simplex

CONTENTS

	Page
Garden Wheelbarrow -	257
About Timber -	258
Forming a Hobbies Club	259
Sound Amplification -	261
Baby Barriers -	262
A Simple Theodolite -	263
Home Improvements -	264
An Ornamental Inkstand	265
Keeping Goldfish -	266
A Stuffed Bird Case -	267
Photographic Alphabet	268
Inkstand Patterns -	271

SUPPLEMENT DESIGN
SHEET FOR EXHIBITION
MODEL DIESEL TRACTOR

Hobbies

WEEKLY

July 26th, 1950

Price Fourpence

Vol. 110 No. 2856

How the handyman can make a strong GARDEN WHEELBARROW

A GOOD barrow is most essential for work in the garden or allotment, and as it is rather expensive to purchase, it is well worth the little trouble in making, if some suitable wood is available. The design shown is of a simple nature, in wood, avoiding the splayed sides which may prove difficult to the woodworking amateur. The barrow loses nothing in efficiency, though, and is a well-balanced article, capable of carrying as much weight as most readers will need, without undue strain.

Stout Timber Wanted

A side view of the barrow is given in Fig. 1. A good stout timber should be employed for making it, as most barrows

get a lot of hard work, not to mention some bumping over uneven ground, and have to stand all weathers. The body of the barrow should be made from wood, not less than $\frac{3}{4}$ in. thickness, elm if available, deal if nothing stronger can be got. However, a good hardwearing article can be made from the latter wood.

The Sides

The two sides are got out from a 9in. wide board. Cut to the length given, and from the top, trim the front end to 45 degrees, and the rear end to 60 degrees. Then cut down to 6ins. at the rear end. The end boards are shown at Fig. 2, one half of each only being given, to save space. These ends can be grooved into the sides, the grooves being $\frac{1}{4}$ in.

deep and spaced about $\frac{3}{4}$ in. in from the ends.

An alternative method of fixing, and a strong one, too, is to screw a $\frac{3}{4}$ in. square wood fillet to the ends of each side piece, and to screw or nail the barrow ends to these fillets instead of through the sides, as at (A) in Fig. 3.

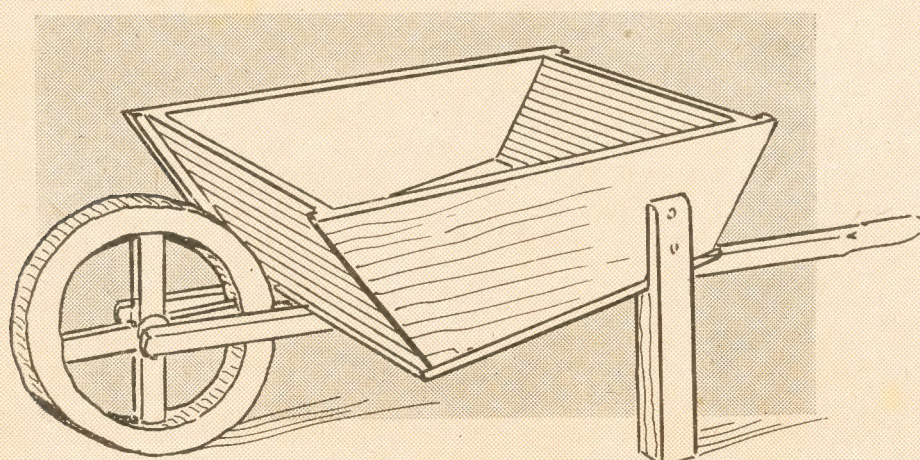
The screws should be well countersunk, ordinary iron ones being quite O.K. for the job. Having fitted the ends firmly, turn the barrow upside down and plane the under edges of the ends level with the sides, to allow the floor of the barrow to bed down flat.

The Floor

For the floor, use $\frac{3}{4}$ in. tongued and grooved boards, laying them lengthwise. Cut the boards long enough to extend beyond the ends $1\frac{1}{2}$ ins., and well nail them to the sides. Owing to the slope of the ends it will be as well to avoid nailing in the usual manner, as some skill is wanted to drive the nails in without them breaking through.

Instead, a strip of wood should be screwed to each end piece of the barrow, as at (B) in Fig. 3, and the floor boards screwed to the strips, making a strong fixing, which is specially needed at this part. This completes the body work.

A pair of long handle bars will be needed, these acting as bearings for the wheel also. Wood, some $1\frac{1}{2}$ ins. thick, or $1\frac{3}{4}$ ins. if you like, and 2ins.



All correspondence should be addressed to The Editor, Hobbies Weekly, Dereham, Norfolk.

wide, will suffice, and if oak or elm can be got, all the better. Cut these to the length given in Fig. 1. A few inches at the rear ends is reduced in size, and shaped up to form comfortable grips for the fingers. A good glasspapering here will help and adds greatly to ease in handling the article, especially when loaded to capacity.

Fix these handlebars to the underside of the barrow, with a single bolt to each, at the rear end. Allow the handle portions to extend beyond the rear end some 12ins., which will probably be

Economical readers may care to purchase a second-hand one, which can often be picked up cheaply enough. It should be 12ins. to 14ins. diameter, not larger. In most cases the axle will require metal bearings to turn in, and this can be met by cutting and fitting metal plates to the inside faces of the handlebars, at the fore end, as shown in Fig. 4 (C).

Iron or mild steel $\frac{1}{4}$ in. to $\frac{1}{2}$ in. will suffice, and most readers will be able to cut and drill these without assistance. However, some time will be saved where the rather tedious job of drilling the metal can be put out to some

See the wheel is fitted centrally, and when right, fix a second bolt to each

WOOD REQUIRED
Barrow sides— $\frac{1}{2}$ in. by 9in. board. 5ft. run.
Barrow ends— $\frac{1}{2}$ in. by 9in. board. 3ft. 6ins. run.
Handle bars—1 $\frac{1}{2}$ in. by 2in. wood. 7ft. run.
Legs—1 $\frac{1}{2}$ in. by 2in. wood. 3ft. run.
Floor— $\frac{1}{2}$ in. by 4 $\frac{1}{2}$ in. tongued and grooved board. 3ft. 6ins. run.

handlebar to secure them to the barrow. All that is needed now to complete the job is a pair of legs. Cut these from stout wood, say, 1 $\frac{1}{2}$ ins. by 2ins. stuff.

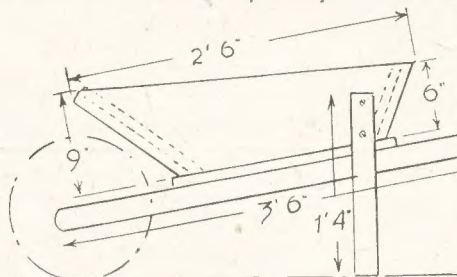


Fig. 1—Side view with dimensions of parts

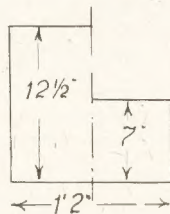


Fig. 2—Half shape of end boards

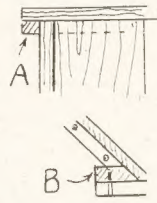


Fig. 3—Fixing methods

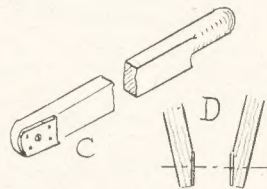


Fig. 4—Metal plate and angle at wheels

sufficient to trundle the barrow without catching the knees.

The fore ends of the handlebars should now be separated enough to admit the wheel of the barrow between. So far as the wheel is concerned, readers may purchase one in cast metal, wood or of the tyred description, as the cost may suit their individual purses.

local metal worker.

A point to notice here is that owing to the angle the handlebars have to be fixed, the bearing faces for the wheel will not be parallel. This can be overcome. Cut sawing wedge shaped pieces off the bars, as at (D) to provide the parallel surfaces needed, a job, naturally, done before the bearing plates are fixed.

The legs should extend below the body of the barrow some 11ins., the remainder being reduced in thickness to 1in. where they are screwed to the barrow sides.

Give the completed article a coat of creosote or two coats of paint, as may be preferred covering every part to ensure it is weatherproof.

Readers should be conversant with these FACTS ABOUT TIMBER

WOOD for pleasure and profit can be looked upon by the model maker in two ways. Firstly, to what use can one put it, and secondly just what can be spared for the wife and the fire?

All wood can be of use to the wood-worker. The true craftsman is loth to part with even the smallest piece. One reason being the difficulty in getting just the right piece for the right job in these times of permits and restrictions.

Wood is classified in two groups; softwoods and hardwoods (coniferous and deciduous). Coniferous is the cone-bearing type or evergreens, and the deciduous the leaf-shedding type. Most coniferous trees are pine or fir trees, and are usually soft and easy to work, but have a sticky or gummy grain. A good method of identifying a soft, easy-working piece of wood is by its weight. If it is light and dry, it is a soft wood, but if heavy either wet or hard.

Soft woods such as Swiss pine and Scots fir weigh about 18 to 21lbs. per cubic foot. A few hardwood and their weights are as follows: Ash, approx. 30lbs. per cubic foot; Sweet Chestnut, 32lbs.; Japanese and American Oak, 45lbs.; English Oak 52lbs.; Honduras

Mahogany, 45lbs.; Spanish Mahogany 52lbs.

Here is a list of the most popular of woods used in model making. The ideal is yellow pine, a beautiful yellowish brown, soft and even in texture, hardly any grain, and seldom splitting in pinning thin pieces together, but has a tendency to warp.

Honduras mahogany is a light reddish brown wood with a streaky grain of hard and soft alternate bands running the length of the board. Care should be taken in selecting this wood, as lightning shakes are very frequent in it. Birch, Sycamore and White Chestnut are also very good woods, and are favoured by turners and wood carvers.

These three are fairly easy to work, but being white care must be used when gluing, as they are easily stained by water soluble glues.

Birch is sometimes favoured for model ship fittings, being very hard and close grained. In colour it is brown with an orange tint, tempting the modeller to leave it without paint.

One hears of models made from matchsticks, spills, and meat skewers, and even from orange boxes. Matchsticks, etc., are mostly from birch, whereas orange boxes may be anything

from pine to oak. One should take care if reduced to using orange boxes, for they are both hard and soft and play havoc with one's tools.

Balsa is, in the author's opinion, the most popular wood of the post-war era for all manner of modelling. It is a quick growing wood and is cultivated in Ecuador on something like rubber plantations. To give some idea of its growth, it can reach a height of 70ft., and 20ft. diameter in 10 years.

The advantage of this timber is that it embraces the full range of woods from soft to hard, there being 47 varieties and textures. The weight varies from 7lbs. to 45lbs. per cubic foot. This wood should be tried and will be found to be the ideal all round wood. It is creamy colour with a straight even grain. One might easily mistake it for the British wood poplar, but the weight should always be the deciding factor in the softer grades. Care should, nevertheless, be taken when selecting balsa for building models of 24ins. and over for, like all tropical woods, lightning shakes are frequent. (211)

Reprinted from The Booklet Sheffield Ship Model Society

Some suggestions and hints in forming and running A HOBBIES CLUB

THE middle of the summer may not seem the appropriate time to talk about Hobbies Clubs, which are, in the main, activities of the winter months so far as readers generally are concerned. The matter, however, must be raised now because it is really appropriate to think forward if the formation of one of these is to materialise by the autumn.

We are constantly referring to the advantages of co-operative work, and readers who are already members of such clubs, undoubtedly find added enthusiasm and interest by having others of a similar character and interest with whom they can discuss matters and work together. We would, therefore, recommend the idea seriously to those keen people who want to improve their ability, and at the same time enjoy their occupations and hobbies with others of a similar mind.

Other Enthusiasts

The formation of a Hobbies Club is a simple matter if you can get other enthusiasts to work together, but even so, it takes time. By formulating the idea now and letting the news get round, you should be able to have the club in being when the autumn season comes along with its darker evenings and added urge for indoor work.

The first thing, of course, is to find other kindred spirits, and then to go ahead with the other details which are necessary before the actual opening night, when you can get down to regular meetings and co-operative effort. Enthusiasm is the greatest virtue for all would-be workers, but there must be a leader in the effort.

Likely Contacts

First of all you have to make contact with others likely to be interested. This can be done by an advertisement possibly in a local paper, saying that a Hobbies Club is suggested and will those interested get in touch with a certain address? If you are a younger reader, you also have the approach through Youth movements, or Scout clubs, or the educational authorities, all of whom will probably be interested.

If you only have three or four potential members at the beginning, that is sufficient for a nucleus to discuss further details. Good news spreads quickly, and those four or five will gradually get it round and others come along. You can have the first meeting to discuss things, and to come down to brass tacks.

Place of Meeting

One is the place where the Club can be held, and there are several alternatives which are worth exploring. A parish hall or a small club room, or even the workshop of one of the members may be

available. The local branch of Toc H or Rotary would probably be of assistance in this respect, in being able to put you in touch with a likely rendezvous. The cost of the hall should not be great, but a rough idea of any required rent should be known, and a note of it made.

Hobbies to Cover

Then you have to consider what activities you are going to undertake, as this will materially affect the number of members likely to come along. You might even add to the woodworking side with the use of the fretsaw predominant in making models, toys, light furniture, pieces of fretwork, etc. You could extend it to incorporate carpentry and woodwork generally, with the idea of making home furniture or larger pieces of work.

Maybe, too, some of the members are interested in photography or model railways, model aeroplane making or stamp collecting. The question of athletics does not enter into it because these hobbies are more catered for already by existing clubs.

Bound up with this is the question of how often you are proposing to meet. It

may be that once a week will be sufficient at the beginning, but if you are proposing to include several of the hobbies mentioned, then possibly two or three evenings will be needed to meet the varied desires of the members. It is possibly unwise to allocate a whole evening to one subject, but rather to get variety by splitting up the programme as far as possible.

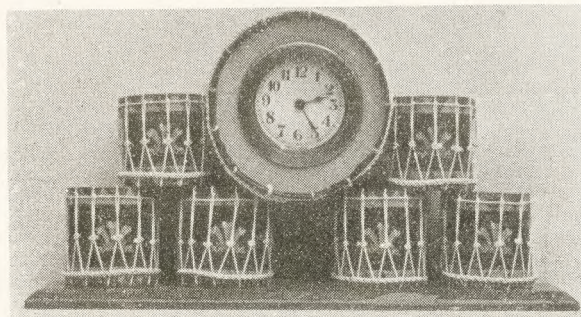
A General Meeting

Each member should be thoroughly interested in the project, but at the same time you will need an outstanding leader who will have tact and patience and the ability to handle with decision, the many questions which are likely to arise. Wrapped up with all these matters is the question of finance, and the success or failure of the club will largely depend on this matter. Consideration of the points previously mentioned will bring out the likely cost, and a rough idea of this must be in hand before you can commence.

The best plan is to call a general meeting of the active members first, in order to go into this question of finance, and to arrange something like a con-

A Novel "Drum" Clock—

THE photograph below is of a decided novelty, and one which other readers may care to copy. The clock holder was made by a 64-year-old reader, Mr. L. A. Hobbs of Northcote Road, Deal, who is still actively interested in our pages and the fretsaw. Only odds and ends were used—aluminium from an old saucepan, 'Prince of Wales's Feathers' from tobacco wrappers, white fishing line to form the braid tightening cords, etc. The actual drums are 1½ in. lengths of 1½ in. diameter cornice pole, and the larger drum 3½ ins. diameter bored for the clock barrel. Aluminium strip ½ in. wide formed loops for the drums, and a 1½ ins. long strip holds each of the two lower ones apart, and supports the one above, when screwed on. Screws through the baseboard hold the lower ones. Colouring is half yellow and half red, and the whole thing forms an attractive, original and unusual piece of work. The clock movement, by the way, was bought from Hobbies Ltd. 29 years ago—and still keeps time!



stitution of the club. In calling a meeting, you may send out preliminary letters to those people who have applied, and also to any of their friends, or to other individuals who are likely to be at all interested.

First Meeting

The first meeting could well be arranged in the home of one of the enthusiasts and all those who come should be introduced to each other to incorporate a general feeling of friendliness camaraderie to start with. You can then get somebody to act temporarily as secretary in order to make a note of the proceedings. The interest of each individual should be put down, and a general discussion allowed with a note made of the result regarding time of meeting, place of meeting, general club interests, etc.

Subscriptions and Costs

The question of cost will have to be threshed out in order to fix a subscription to be paid weekly or monthly. This subscription must be sufficient to cover the general expenses such as rent, lighting, heating, postages, notepaper, etc., and although this may seem to mount up in the first instance, much of it will not occur again, and so can be spread over a considerable period. It must be definitely arranged for the collection of the subscriptions, the payment of which regularly, is essential.

Do not let the meeting hang about too long, but cover the points required with speed and decision. If there are only a few of you, then the matter can be talked over quite easily. If the meeting is larger and the membership likely to number more than a dozen, then a good plan is to appoint the usual officers to run the whole thing properly.

The Officers

There should be a secretary, treasurer, chairman, and possibly a subscription secretary if thought necessary. The duty of the secretary, of course, is to deal with the executive side and definitely to keep a book with the minutes of the meetings held. These minutes need only be quite short, but should give the definite facts which are arrived at after discussion. The details of the discussion itself do not matter, but the subject should be dealt with in the minutes by saying that such and such a thing was decided upon.

The secretary will also be responsible for notifying members of meetings, if they are not being held regularly, and also arranging programmes and general particulars.

The treasurer will be responsible for the financial side, and should certainly keep a definite cash book to show what money is received and exactly how it is spent. A list of the members is also kept in a book where subscriptions are entered when paid. If columns are ruled for each week or month, a space is available to mark them off against the name of each one as he pays. The lump sum of the subscriptions can then be

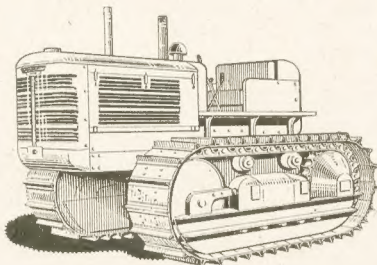
entered into the main book of the treasurer.

Associate Members

A suitable source of income is made sometimes by making interested people Associate Members. They are the ones who are sufficiently interested to pay, say, an annual subscription for the good of the club generally, but who may not

Our Supplement Design for a small model DIESEL TRACTOR

THIS realistic exhibition model of a large haulage tractor is 9ins. long and 6ins. high—built quite readily from the extra large pattern sheet with this issue. A complete kit of materials (No. 243 Special) is obtainable from Hobbies Branches for 7/4 or by post from Hobbies Ltd., Dereham, Norfolk, for 8/1. A list of the addresses of Branches is given on page 270 of this issue. Or of stockists in most towns.



take more than a nominal interest, and will not take an active part. Possibly some shopkeepers or firms whose interest is in hobby work and materials, may like to become this type of member.

Rules of the Club

A few rules should be drawn up at the first meeting, and although these can be added from time to time, they should be as comprehensive as possible first. If you can go to the expense, it is as well to have these rules printed on a little card, with the name of the club and the address of the secretary.

The rules will cover the name of the club, the objects for which it is formed, the range of its membership, mentioning age and interest, the question of associate members, the date and time of regular meetings, the subscription cost, etc. A note should definitely be made that members will cease to belong to the club when their subscription falls in arrears of, say, six months. It may also be advisable to mention in these rules that the annual meeting will be held during a certain month. This is when the question of alterations and policy decisions can be taken.

If you have a wide range of interests, then it may be worth forming a small committee which will meet apart from club nights, to talk over incidental matters, suggestions, etc.; which may arise. Names for this committee should be voted by other members generally, with a view to their knowledge and enthusiasm.

The question of temperament enters into this, in so far that a garrulous member of the committee may take up too much time in talking, or a member may be too keen about his individual interest for the general good of the club. Here again, a tactful and decisive chairman is a great asset. A good leader can hold together a committee and the members with a little tact, and so ensure the smooth running of the whole.

Publicity

Members should all agree to give as much publicity to the club as they can, because it is only by spreading the news of its activities and interests that other likely members can learn about it and come along. The various officers in every case should be chosen for their ability, and for the good qualities of mixing and handling with the other people.

It should, too, be impressed on them all, the need for regularity of attendance and subscription payment, their willingness to help in a general co-operative effort, and their enthusiasm to keep the club to a high standard without quarrels or petty disputes.

When the club is in being, the continued interest of all members must be maintained by a variety of activities, by the general co-operative effort of all of them, and the feeling that they are helping each other as well as themselves. The selfish individual who wants to do one particular job, or to be a more outstanding member than others, should learn to spread his ability over a number of jobs, and to row in with the others for the general good and advancement of the whole club.

Draw Up a Programme

For this reason, a definite programme should be drawn up so if a fellow feels a little uninterested in next week's work, he may realise that, perhaps, the week after there is something on in which he can really revel.

On the other hand, the programme must not be too hard and fast, and each night the club meets, there should be an opportunity of general relaxation for discussion or raising of new ideas or suggestions for something to be done of a different character.

Apart from the actual work in hand, the club may be able to undertake visits to works or firms or places of interest which will help to maintain the enthusiasm and offset the regularity of the meetings.

These can usually be arranged if you write courteously to the Publicity Dept. asking them to state a convenient time. Do not forget, however, that factories do not usually run in the evening so a day visit is better if possible.

(To be Continued)

An interesting simple microphonic experiment to increase SOUND AMPLIFICATION

HAVE you ever heard a fly walking? If not, here is a simple electrical gadget that will enable you to do so—if you can persuade a fly to take a constitutional over the desired place on the instrument. The ticking of a watch will sound like a shipbuilder's yard in full swing, and the tapping of a finger like a steam hammer at work.

Early Microphones

It is by no means a new idea, for it was devised by Professor Hughes in the early days of telephony to demonstrate the microphonic effect of electrically conducting materials in loose contact with each other. It is, in fact, an extension of his classical 'Three Nails' experiment, shown in Fig. 1.

The device, known as the Hughes carbon microphone, is the forerunner of the carbon microphone as we know it today, and is extremely sensitive to even the smallest noise and vibration.

So sensitive, in fact, that it is quite useless as a commercial proposition, for obviously it cannot be handled in the same way as can an ordinary microphone. Nevertheless, it has uses apart from the purely entertaining, and is quite a valuable piece of test equipment in the amateur watch repairer's workshop.

Construction

First of all we require three carbon rods, and those from an exhausted dry battery will be quite suitable. Two of them are kept intact together with the

two rods have a small depression drilled near the ends remote from the brass cap, as in Fig. 3.

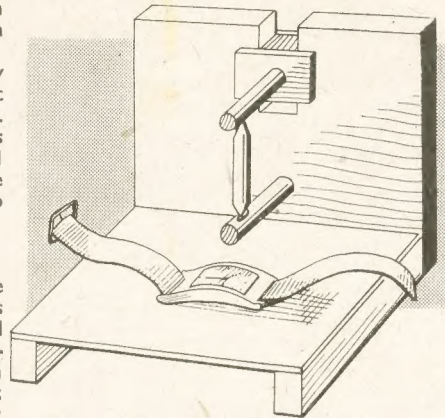
This operation is more easily accomplished if a slight flat is first filed on to the rod before drilling. The drill size is not critical nor is the depth of the depression, and the size required can easily be judged from the size of rods to be used.

The Sounding Board

We can now proceed with the sounding board. Since readers will be using rods that are to hand and which will vary in size depending on the size of battery from which they were taken, it is not possible to give exact dimensions; but the general requirements will be easily seen from the drawings.

A piece of plywood about 4ins. square is required for the base and two pieces of wood 1in. by $\frac{1}{2}$ in. by 4ins. act as side supports. These may be pinned or glued into position. A stout piece of wood about $\frac{1}{2}$ in. thick is chosen for the back support, and after it has been cut to suit the base it is prepared, as shown in Fig. 4. Its height should be such that the portion projecting above the base—(X) in Fig. 4—is about 2ins. greater than the length of the sharpened rod.

The first step is to hold it against the base in the position that it will finally occupy, and draw a pencil line along its length where base and back meet. This line is used as a reference for marking the hole and slot.



From this point measure $\frac{1}{2}$ in. down which represents the depth of the slot from the top of the back support. Now mark out the slot about 1in. wide in the centre of the support, and saw down the pencil lines, using as fine a sawblade as possible. Remove this portion by gently tapping at the bottom of the slot with a chisel, but do not throw it away—part of it is required for the next operation.

Easy Movement

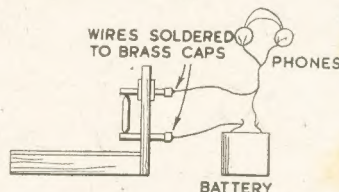
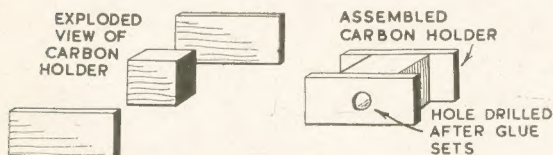
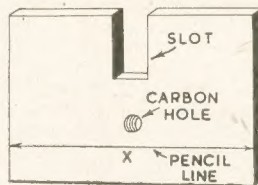
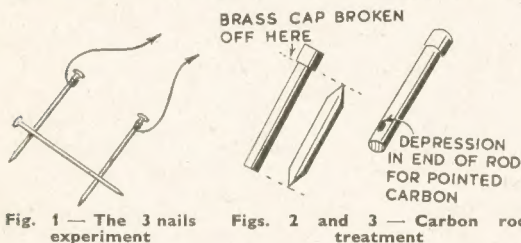
From this, cut a piece about 1in. long, so making a rough square. Try it in the slot to ensure that it can be moved from top to bottom without fouling the sides at any point.

Two pieces of thin plywood 1 $\frac{1}{2}$ ins. by 1in. are now glued to it to form flanges (Fig. 5), thus forming a bobbin shaped piece which can be moved up and down in the slot. Before gluing, hold the pieces together in the fingers and ensure that the flanges grip each side of the slot, for it is necessary that this piece should stay put in any position to which it is moved. If it is too slack, rasp a little off the thickness and try again.

When the glue has set, drill a hole from one side to the other, using the same drill that was used for the carbon hole in the back support, and make sure that the other carbon is a tight push fit in it.

The back plate can now be pinned or glued to the base-board. One unsharpened carbon is pushed into the lower hole so that it protrudes about $\frac{1}{2}$ in. beyond the wood with the depression uppermost, and the bobbin-shaped piece carrying the other carbon is pushed into the slot with the carbon depression downwards. The sharpened carbon is now placed between the two, with each end resting in each of the depressions. It should be held quite loosely and the rods adjusted so it is quite vertical with respect to the back support.

(Continued foot of page 262)



brass caps on the ends, but the third has the brass cap removed. To do this it may be necessary to break off that part of the rod to which the cap is attached, thus shortening it slightly. However, the reduction in length is of no consequence.

This latter rod is now carefully sharpened with a file to a pencil point at each end, as shown in Fig. 2. The other

About $\frac{3}{4}$ in. above the line and in the centre of the plate, drill a hole of such a size that the carbon rod is a fairly tight fit. Push one unsharpened carbon through the hole so the depression just shows on the other side of the wood. Holding the sharpened carbon vertically with one end resting in the depression, mark the approximate height of the other sharpened end on to the wood.

Save worry and prevent children's accidents by MAKING BABY BARRIERS

THERE is a theory of course that it is a bad thing to keep young infants from crawling at their whim, but failing a nurse to superintend constantly, it is much safer to make a barrier or two and perhaps save a serious stair fall or other accident.

There are several ways of making barriers. One way is to buy a sheet of three-ply and with the aid of slots made of beading at the side of a doorway fix the sheet to slide into position. But the sheet will need a stiffening piece of wood at its top, and is rather heavy and unlovely to look at.

Dowel and Rails

The type of barrier described in this article is much lighter and less displeasing to the eye than the sheet type. The baby

wood start by trimming with a bench hook and tenon saw the lengths of dowel. Make each about $\frac{3}{4}$ in. shorter than the total overall height of the finished barrier.

Next plane up the 1 in. by $\frac{3}{4}$ in. wood and carefully mark square. Cut lengths about $\frac{3}{4}$ in. less than the gap into which the barrier is to go. Divide each length into six on the wider side, which will leave five equally-spaced marks for holes along the middle into which the dowel rod is to fit.

These holes are of the same diameter as the rod itself and should go to such a depth into the wood that the point of the wood drill just fails to show on the opposite side (see Fig. 2 C). Perhaps it would be as well to practice on a spare bit of wood before boring a hole in one of the pieces you are going to use.

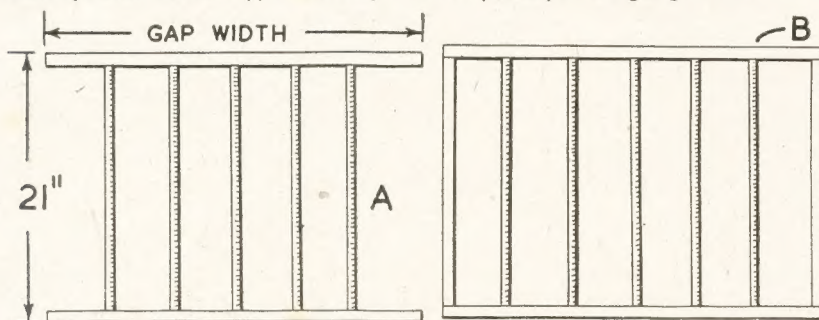


Fig. 1—An ordinary barrier (A) and a suitable stairway gate (B)

can look past it when it sits down on its own side to watch what is going on in the most desirable forbidden territory.

Three barriers such as shown in Fig. 1, made of $\frac{3}{4}$ in. dowel rod and 1 in. by $\frac{3}{4}$ in. batten cost just under eight shillings, with an extra shilling for 6 ft. of quarter-round beading as side fixings. You will probably find that the shop sells lengths of dowel rod ready cut, and for these gates 2 ft. lengths are ample. For ease of stepping over for a person of average height, the gates should not exceed a total height of 21 ins., making it necessary to trim down pre-cut dowel rod to about 20 ins.

Each gate will take five rods and exactly double the width of gap of top and bottom wood, as well as 2 ft. of beading for fixing. When you get the

Glue the dowel rods into the holes and along the bottom of the gate put a panel pin through the wood into the dowel ends. Let the gate stay overnight in the position it is to occupy—the glue will then stiffen with each rod at exactly the right angle for the gate to fit well. If necessary panel pins can also be put along the top of the gate—but the gate should be strong enough without them.

Drop Sockets

Cut the beading for sockets into 6 in. lengths, then with thin panel pins of about 1 in. length, tack the beading as shown in Fig. 2 (D). The advantage of having short pieces of the length given is that the gate can be disengaged after raising only 6 ins. A longer strip of beading running up to double the height

of the gate would be necessary to ensure that the top did not disengage with less than a lift of the gate height, and this long lift is quite unnecessary. Incidentally, it may be possible to make one gate suffice for several places if the widths happen to be the same.

Stair Gates

A gate at the bottom of a stair may be less easy to fix unless it has sides as shown in Fig. 1 (B). The sides can be added after the dowel rod type of gate is finished. But a more workmanlike job can be made by making a tongue-and-groove joint at each corner as shown, before the gate is first assembled.

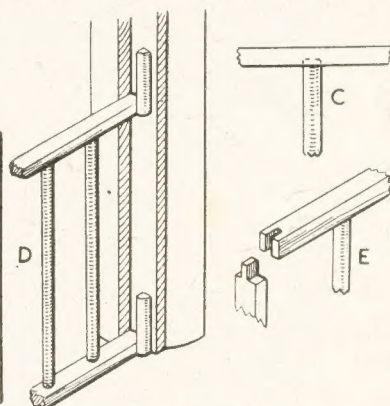


Fig. 2—Fixing socket and joints

The joints should be strengthened with a panel pin put through sideways when gluing up is carried out. Afterwards, when the glue has had time to set hard the corners can be trimmed with a chisel and plane, being careful to plane inwards from the corner in each case.

The edge piece will then enable the barrier to fit into any system of beading slots tacked with panel pins to the side wood of the stairs. The advantage of using thin pins is that when the baby no longer needs to be kept from climbing stairs, or going past various points on its own, the beading can be gently prised away—leaving only almost invisible pinholes to mark the place where the beading was once fixed. The finished gates can be stained or painted as desired. (192)

Sound Amplification—(Continued from page 261)

All that remains now is to connect up the battery—a flashlamp battery will do—with earphones as shown in Fig. 6, and adjust for best results. The connecting wires to the rods may be soldered to the brass caps.

To adjust the instrument, lay a watch on the sounding board and move the piece carrying the top carbon rod so that the sharpened carbon is very loosely held. Don the earphones. It is not advisable to have the earpieces right

over the ears when these initial adjustments are being carried out, because the microphone gives out some shattering noises at first.

Tap the movable carbon holder very gently downwards and listen after each tap. At first, nothing will be heard except the explosive bursts caused by the disturbed carbons. But very soon a point will be reached where the sound of the watch comes through clear and powerful—the sledge hammer tick, the twang of

the hairspring and the various other noises caused by the moving parts.

The instrument is now in a state of true microphony and when this point is reached, the movable piece can be fixed in position with a spot of glue. If a fly should now alight on the vertical rod the sound of its movements will be clearly audible in the earphones.

Finally, when the instrument is not in use disconnect the battery or it will become exhausted. (195)

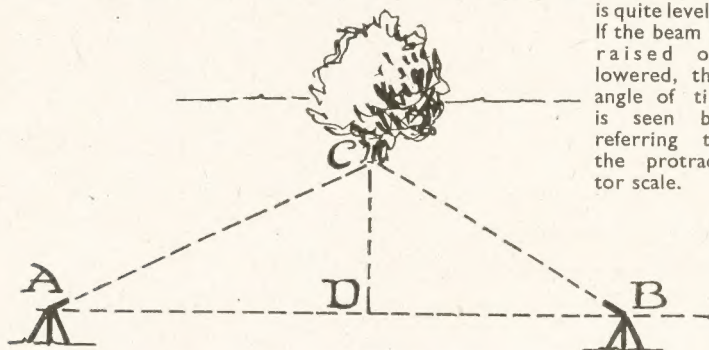
There is much interest resulting from making A SIMPLE THEODOLITE

THE simple theodolite described here is obviously not designed to compete with the very expensive professional models, but if well made and carefully used it gives good results, and is useful for teaching simple surveying

This beam is also fitted with a protractor and a plumb-bob, the thread of which shows through an opening in one of the supports. When the beam is perfectly horizontal, the thread lies against the 90 degree mark on the protractor (assuming the lower table is quite level). If the beam is raised or lowered, the angle of tilt is seen by referring to the protractor scale.

up the instrument at A, any convenient distance away, and sight the top of the tree B through the sights of the beam. We note the angle BAD.

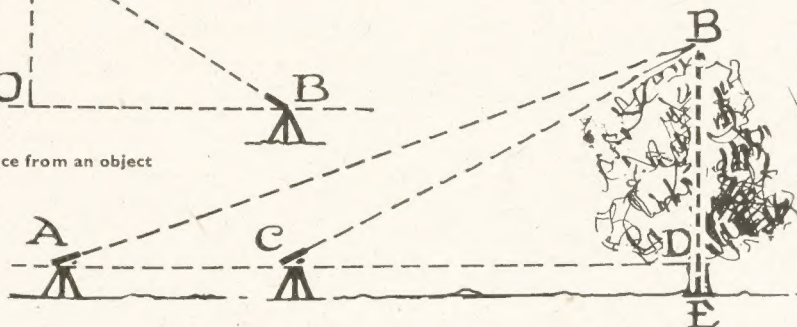
Then we move the instrument to C, measuring the distance AC, with the instrument set up perfectly level and at the same height as before. We take the angle BCD. With this data we can work out the height of a tree (or rather the height of the tree above the line ACD). As we cannot take it for granted that every reader will know any trigonometry, the problem may be worked out by making a scale drawing, and scaling off.



How to find the distance from an object

at schools, etc. The model forms a useful Scout project, is soon made from odd pieces of hardwood, and repays the work involved by the pleasure it provides. You do not have to be a maths wizard to be able to use it.

Essentially, the theodolite is an instrument for measuring angles, both horizontal and vertical. The lower circular base is rigid, and is fitted to a tripod. On this table another circular plate revolves. It bears two supports to take a swinging beam, bearing sights at each end.



How to find the height of a tree or building

Much in the same way the lower base is fitted with a scale of angles, zero (b in the sketch) being in line with the beam above. If the beam, and consequently the whole upper turntable, is moved horizontally round, the angular amount of turn towards A or C is shown on the lower scale by the pointer fixed to the turntable.

Finding Heights

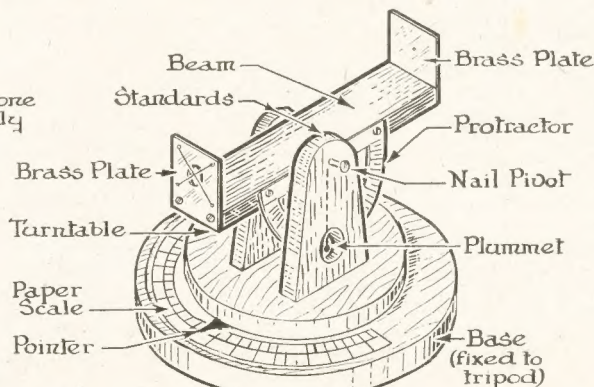
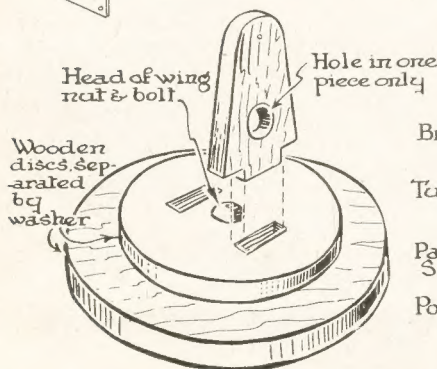
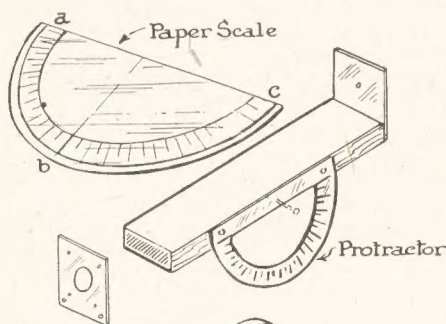
Reference to the main drawings will make the foregoing clear, whilst in the smaller diagrams we see how the instrument is used in actual practice. Suppose we wish to find the height of a tree. We set

In the foregoing, the top of the tree is not necessarily vertically above the centre of the trunk at D, and the angle BDC not necessarily a right angle. In the case of a flagstaff, etc., where the angle BDC is a right angle, only one sighting is necessary, and it may be as well to make a start on such a simple problem.

For Distances

The horizontal scale is used to find out how far away any conspicuous object is. In the drawing, a base line ADB is measured, and sights taken from the ends to the tree trunk C. An accurate scale drawing may then be made and the distance CD scaled off. Other problems, such as finding the width of a river, etc., will suggest themselves, whilst such work affords a good introduction to the study of how land is surveyed for map reading.

The bulk of the article has been taken up by a description of how the instrument is used, for the reason that when



The various parts in the construction of the instrument

(Continued foot of
page 265)

Simple practical additions which make for HOME IMPROVEMENTS

A CLOTHES stand in the bedroom is a good idea because not only does it air the clothes used during the day but it can also be useful when the wardrobe is full. It may be handy when you have visitors staying in the house; it is also a good plan to teach children to be tidy.

A Clothes Stand

First take a piece of board to measure 15ins. by 18ins. and find two well sanded broom handles for the uprights. You will have to cut these to the required height. Screw these uprights to the board as shown in Fig. 1. Fix them so you can fit a coat-hanger on the top. You can cut the handles so the hanger slots in or just screw it down, depending on the thickness of the hanger.

Two cross struts, made from $\frac{1}{2}$ in. dowelling will be placed at top and bottom, as shown. Adjust these to suit your own taste and allow for skirts or trousers. A safe height above base board should be about 4ins. Stain the base and provide a square of cork for

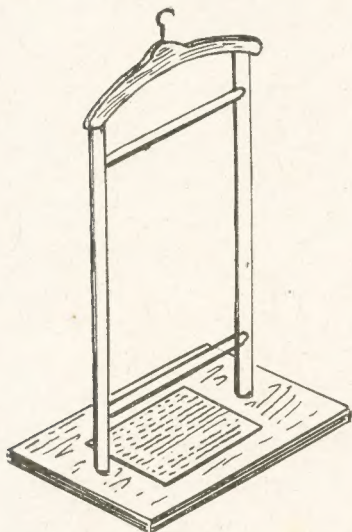


Fig. 1—A handy bedroom clothes stand

shoes to stand on to complete a nice neat compact and tidy article.

We generally want our slippers in the sitting room but no housewife wants them strewn all over the place. So why not have a slipper box (see Fig. 2) on the sitting room wall or at least nearby?

You need a box about 15ins. deep and 6ins. wide so it does not take up too much room. It can be made to fix on hooks just above the skirting and covered in cretonne to match the furnishings or curtains. Such a box will hold quite a few shoes.

Due to additional members of the family growing up we are often faced

with having two wardrobes in the same room. Few rooms can stand this really and the best plan is to turn the existing wardrobe across the corner and extend the coverage for clothes on either side, as shown in Fig. 3.

Wardrobe Extension

This will allow you two fine deep corners which will take no end of clothes. As there will be a good depth below the hanging clothes you can then fit in a shelf to shape on either side and thus store more shoes and other items away. If the fittings are made as shown they can be taken down at any time.

Having fitted the wardrobe and seen it stands firm, try and procure a rod or bar to go right across the top of the wardrobe and touching the wall on either side. From this you can either hang your curtains on large rings to move along as required or fix one of those very convenient curtain railways which are so simple to fit.

You must now cover in the top to exclude dust and this can be done with panel board. Fix a light batten to the wall just a little above the curtain rail.

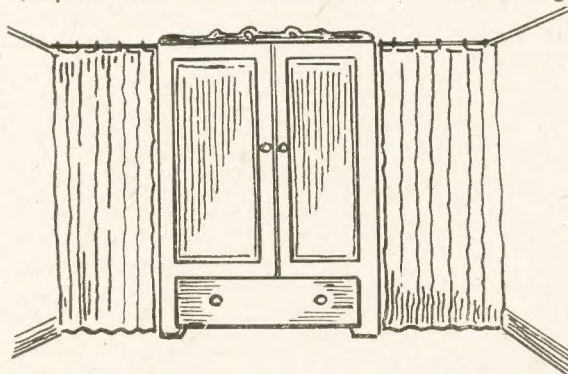


Fig. 3—A curtained extension to the wardrobe

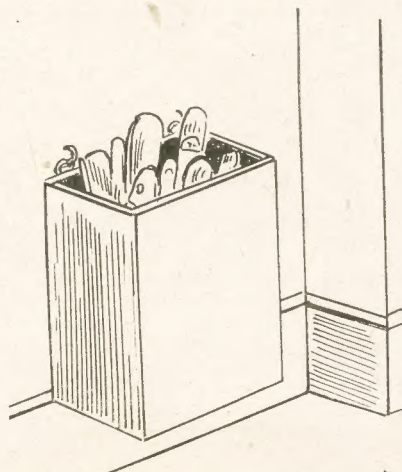


Fig. 2—An upright wall slipper box

You will have to make the panel clear the curtain and will require a beading of 1in. along the front edge to save it from bending. There is no need to cover the top of the wardrobe because this is already covered in.

It is a bit awkward when someone wants to do his or her homework or a member of the family wants to write a letter and mother wants the table for ironing. Why not a hanging bookcase and desk combined? Surely you have just one little space in the room where an article such as shown in Fig. 4 can be fitted.

Hanging Bookholder

You can make it with some boards about 8ins. deep. Try and get something fairly good as it will have to be part of the furniture. The width of the case is 2ft. 6ins. (larger if you wish but remember it is hanging, not standing). The depth is 2ft. 6ins. also. Arrange for two shelves which can be 9ins. apart. Consider what you intend to have in it or who is going to use it and then adjust accordingly.

The writing part is made 2ft. 6ins. wide and the depth of the space left under the lower shelf. Take a cut away from each side so that the desk part can be shut up and hinged, as shown. Chains are fitted to each side to support the flap. A fancy handle is added and the whole article stained in keeping with the furniture.

Fix to the wall with Rawlplugs and use at least four, as the weight will be somewhat heavy when in use. If in doubt, two light battens up the wall will not be noticed very much but at the same time, do not overload it. Make strong workmanlike jobs of all and finish off neat, clean and tidy to prove your efficiency and ability. (174)

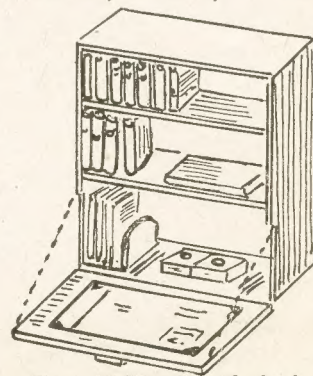


Fig. 4—Wall box fitted for books

Carved or fretted patterns on page 271 for this ORNAMENTAL INKSTAND

THE illustration, Fig. 1, given on this page, shows a simply-made inkstand decorated with low-relief recessed carving or by a simple fretted panel. Full size patterns of the parts are shown on page 271, as well as constructional detail drawings.

The base will be the first part to make, and this consists of two layers of $\frac{3}{8}$ in. wood, as shown on the plan in Fig. 2. The lower piece measures 9 ins. by $3\frac{1}{2}$ ins. and the edges of three sides may be rounded off neatly or left square, as shown. The upper member is $8\frac{1}{2}$ ins. by $3\frac{1}{2}$ ins. and will have the three openings cut in it, as shown in the plan.

Ink Bottle Apertures

The two square openings are for a pair of ink bottles of the sloping front variety which are most convenient for use with such a stand as this. Set out the measurements given, either direct on to the wood or on to paper. From the paper pattern the shapes can be transferred by means of carbon paper to the wood.

Where the openings have been cut out with the fretsaw, clean off the cut edges with fine glasspaper before gluing down the piece to the lower member. In applying the glue, use it sparingly and thinly, so that when the two layers are finally cramped together, the glue will not squeeze out and spoil the neat effect.

One or two flat-head screws may be run in from the underside of the lower-most base to hold the two pieces securely together, the heads of the screws being properly countersunk. Finally clean up the back edge of the base.

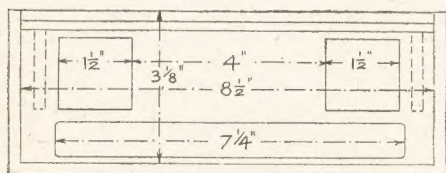


Fig. 2—Plan of base parts and overlay

There are two methods of making the back. One is to have a solid piece of $\frac{3}{8}$ in. wood, and the other to have two pieces of $\frac{3}{8}$ in. glued together. The front piece in the latter case being prepared for the carving. If the one piece of solid stuff is used it will be necessary to cut it to outline only and set in the carved design with chisel and gouge just as ordinary relief carving. We give a full size pattern of the back on cover three of this issue.

The actual outline may be traced and then re-drawn on the wood. On this solid piece of wood also must be transferred the floral design ready for carving. The piece of wood should be securely clamped to the bench and the whole outline round the design cut down with, say, a $\frac{1}{4}$ in. chisel and gouge, to a depth of about $\frac{1}{8}$ in.

The floral design, as shown here, has been prepared also as a fretwork overlay, the small pieces connecting up with the main frame of the design being, of course, cut out. The whole ground-work is recessed to the depth given and later gone over with the matting punch which gives uniformity of texture all over and makes suitable contrast to the carved work which can now be completed.

Do not over-elaborate the amount of carving, but just pare away the wood in certain places to emphasize the rounded stems and the grooving between.

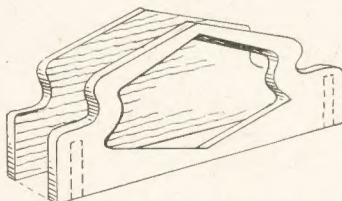


Fig. 3—The two-part back

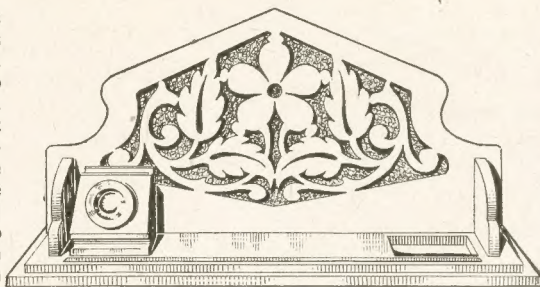


Fig. 1—The completed stand with ink holder in place

The second method of making the carved back is, perhaps, the simpler. At Fig. 3 there is shown the first process of cutting the main back piece $\frac{3}{8}$ in. thick and the front frame which is to be glued to it. The interior floral portion is cut out separately from the frame. The same piece of wood, however, is used from which the frame has been removed.

The overlay is glued to the backing piece and the carving carried out somewhat as in the first method. The backing should be matted in a similar way to that previously suggested after the gluing has been finished. On the pattern sheet is shown a very simple design which can be used as an ordinary fretwork overlay to be glued direct to the backing pieces and with the interior openings matted, as shown. After a final cleaning of the top surface of the base, the back upright may be glued and screwed on, as in the detail Fig. 4.

To stiffen up the two parts, the base with the upright, two brackets as (B) on the pattern sheet are cut out and glued.

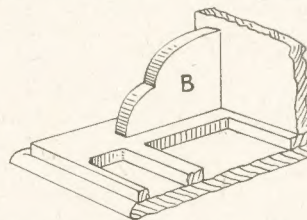


Fig. 4—Cut-away showing assembly

Theodolite—(Continued from page 263)

one is sure how it works, the construction presents little difficulty. No definite dimensions need be given, since odd scraps of wood may be utilised. Nothing but well-seasoned hardwood should be used. The base is about a foot in diameter and the turn-table 9 ins. diameter.

The scale of degrees with every 5 degrees and 10 degrees emphasised is drawn on cartridge paper, and there is no need to carry it all round the base; through 180 degrees is enough, or rather for 90 degrees each side of the central zero line. A small brass pointer is filed up and let in flush with the underside of the turn-table.

On the turn-table two standards are tenoned in. These are about 4 ins. high and about $2\frac{1}{2}$ ins. wide at the bottom, with the tops tapered and rounded off. One has a large hole bored in it to show the plummet. The beam is about a foot long and of $1\frac{1}{2}$ in. by $\frac{1}{2}$ in. section wood.

Square plates of brass are screwed to the ends. One has a very small hole pierced in it. The other has a fairly large hole, across the centre of which thin wires intersect. Four small holes are drilled to take these wires.

A metal protractor such as supplied with geometry sets is obtained and screwed to the centre of one side of

the beam, as shown in the drawing. The beam is pivoted to the standards by means of large nails driven in. To one of these the plumb-line is attached.

If one can take the extra trouble, it is better to draw one's own semi-circular scale with zero in the middle (where 90 degrees is on the protractor). This saves having to subtract the reading from 90 degrees. The nails pivots should be driven in line with the centre of the protractor.

The turn-table is connected to the base by a wing nut and bolt, with the two parts separated by a thin washer, so the turn-table revolves easily.

Tanks, stocking, feeding, ailments—all about THE CARE OF GOLDFISH

THERE are probably more fatalities among goldfish than among any other creatures kept as pets. It is not that goldfish are abnormally delicate or that their care is a highly complicated matter. The trouble in nine cases out of ten is that their owners do not appreciate that goldfish need plenty of space.

Small glass bowls are inadequate in size and the narrow neck of the bowl restricts the surface area of the water exposed to the air so the fish suffer acutely from a lack of oxygen.

The ideal amount of 'elbow-room' for goldfish should be reckoned as 1 gallon of water to 1 in. of fish. A 4 in. fish, therefore, requires 4 gallons of water, two 3 in. fish 6 gallons, and so on. This, of course, is the ideal arrangement, but it may not always be practical, but do try and get as near to it as possible. If you can only provide a 1 gallon container it would be kinder to abandon the idea of keeping goldfish altogether.

The Tank

All-glass tanks are expensive, but you should be able to obtain an iron and glass tank 18 ins. by 12 ins. for about 30/-; much cheaper, of course, from a good second-hand dealer. Another idea is to visit a builder's yard, for very often one may find an old kitchen sink lying around unwanted. This would be preferable to a miserably inadequate-sized fancy glass bowl. The greater the surface area of the water, the better for your fish.

Now to set up the tank. This should be attended to about a fortnight or so before you buy your fish in order that the fresh-water plants introduced shall have time to establish themselves. Firstly, the tank should be thoroughly cleaned. Next, draw off sufficient tap water and let it stand in a dust-free place for a couple of days, stirring it occasionally.

This procedure is necessary, as most tap water is chlorinated these days, but under the treatment described the chlorination wears off.

A Sandy Floor

Having topped up the tank, the next job is to cover the bottom with clean fine sand (aquarium sand is best, obtained from pet shops). It is advisable to wash the sand well, as you will be surprised at the amount of dirt it contains. The sand should slope gently from the back of the tank to the front (say, 3 ins. at the back and 1 in. deep at the front). This is necessary in order that food scraps and other rubbish shall collect at the front of the tank, from whence it can be removed more easily than if scattered all over the bed of the tank.

It is no use putting in the sand before

the water, for the simple reason the water will wash the sloping sand level. The best way is to cut a piece of cardboard about the same size as the front of the tank, insert it near the back of the tank and then empty in the sand. By careful manipulating you can thus control the level at which the sand settles on the bottom of the tank and so achieve the desired slope towards the front.

Water Plants

Pay a visit to a pond and collect a dozen or so water plants, being careful not to damage their roots. Wash them thoroughly in running water and then, with the aid of a forked stick, gently push the roots well home in the sand at the bottom of your tank. The larger plants should be set towards the back of your tank where the sand is deepest.

After covering your tank with a sheet of glass or plywood (raised 1 in. or so above the top edges) in order to keep dust, etc., out of the water, allow your tank to stand for ten days or a fortnight so that the plants will take root and commence aerating the water. At the end of this period you may safely instal the fish.

There are several good dry foods on the market, but always avoid over-feeding, as uneaten food tends to pollute the water. Goldfish will appreciate Daphnia, which is a live food—a type of fresh-water flea obtainable from most pet shops. Earthworms, if finely chopped, may also be given.

To Prevent Chills

When topping up the tank, always be sure the water is of the same temperature or not lower than that already in the tank. Goldfish are likely to catch chills if colder water is added. One sign that the water needs changing is when you see the fish coming to the surface for air, as this indicates a deficiency of oxygen. Remove any rubbish without delay and cut off any dead leaves of plants.

Too much direct sunlight will promote the growth of algae on the inside of the glass. Fresh-water snails will do a great service in keeping the tank sides free of scum.

Common Ailments

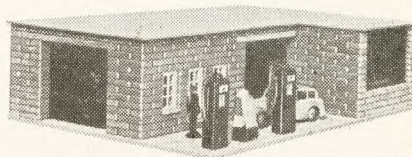
Goldfish, although reasonably hardy, occasionally suffer from one or other of the three following ailments, so you should know what measures to take. Fungus—a white fluffy growth on the fish, is, perhaps, the most common complaint.

Remove the fish and place in another container in which the water contains a solution of sea-salt (obtainable from chemists) in the proportion of one ounce of salt to a gallon of water, the temperature of which should be the same as

in your tank. The fish should be immersed in this salt-water 'bath' for about two hours every day until cured.

Chills we have already mentioned. Special care should be taken during very cold weather; when changing fish from one tank to another; or when adding fresh water. Sudden changes of temperature must be avoided at all costs.

Constipation in goldfish is not uncommon. Fish suffering from this ailment will be seen swimming with their droppings trailing from them. A deficiency of fresh food is the usual cause, so give Daphnia or finely chopped worm without delay. (182)



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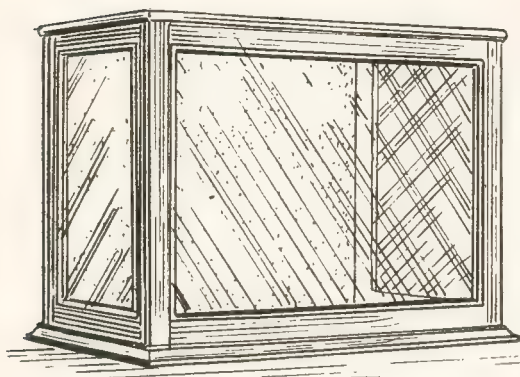
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No dimensions can be given as obviously, these must depend on the size of the stuffed specimens. Ample space should, however, be provided, to prevent an unpleasantly crowded appearance. Having decided on the dimensions of the case, prepare 4 upright posts, and 8 horizontal rails for the framework.

The posts will be the actual height of the case, less base and top, and the rails $\frac{5}{8}$ in. less than the full width or depth of it. The whole will be of 1 in. square wood throughout. Plane the strips of wood to these sizes, then set out and cut the corner joints to make a framework, as shown in part, Fig. 1.

The corner joints are detailed in Fig. 2. Sizes of the tenons are given in detail (A), the mortises being cut in the posts to correspond. As the tenons will meet together in the mortises, as at (B), mitre them. Test these joints and if necessary glasspaper or file the mitred ends of the tenons if they are a shade too long and likely to prevent the joints closing up properly.

It should be remembered that when glued up, some of the glue will come between these mitred joints and possibly prevent what would otherwise be a close fit, hence the warning.

Before gluing up the framework, cut the top and base of the case. These should be the same outside dimensions as the framework, and it is important to see they are cut truly square at the corners. Both could be

cut from plywood, at least $\frac{1}{4}$ in. thickness, or possibly a good quality substitute board.

Glue the framework well and knock the joints up tight, then place on the base and test for squareness. Any faults in this direction can then be remedied. Tie tape round the framework, top and bottom, as tightly as possible, to hold all joints securely while the glue gets hard.

Assembly

The framework can now be levelled over, at top and bottom, if necessary, to provide a flat seating for the top and bottom of the case. Fix the bottom first with glue and screws, the latter well countersunk. Then the top can be similarly fitted, but using nails instead of screws. Suitably sized oval nails will do, the heads being punched slightly below the surface and the holes stopped up level.

To hold the glass in position, beading is superior to putty, and much less troublesome, especially if any of the glass unfortunately gets broken and needs replacement. The beading for the inside can be plain slips of wood $\frac{3}{16}$ in. or $\frac{1}{4}$ in. thick and $\frac{3}{4}$ in. wide.

Inside Beading

Prepare these accurately to length and mitre them at the corners. Fit them in with a little glue, and fine nails. Let the back edges of them be level with the inside surface of the framework, leaving just $\frac{3}{8}$ in. in front for glass and beading in afterwards.

Glass will be required for front and ends of the case, but for the back, wood can be substituted. The detail (F) in Fig. 3 shows the back, which can be of plywood or substitute board, fitted in and kept in place with a plain slip of wood outside. The outside glass beading is of $\frac{1}{8}$ in. by $\frac{1}{2}$ in. section wood, the outer edges of which are neatly rounded. Cut and mitre them to fit each panel

opening, but do not fit them in just yet. Instead, finish the case.

Base Edging

At the edges of the base a $\frac{3}{8}$ in. by $1\frac{1}{2}$ in. moulding can be mitred round, fixed with glue and screws, as at (C) in Fig. 3. This by the way covers only the front and ends, the back being a plain strip, level with the bottom of the case, and not extending beyond. Alternatively, a plain $\frac{3}{8}$ in. by $1\frac{1}{2}$ in. strip of wood can be used here, with a half-round or moulded strip covering the edges of both strip and bottom, as at (D). The moulded strip is omitted at the back of the case.

The edges of the top of the case can also be hidden by gluing and pinning round a $\frac{3}{8}$ in. half-round moulding, as detailed at (E). The woodwork can now

Polish on Hands

AFTER doing french polishing, difficulty is found in removing polish from the hands. Place half a handful of washing soda in hot water, soak the hands for a few minutes and wash off with clear water.

be glasspapered to smoothness, and finished. The interior of the case can be painted sky blue, or otherwise decorated, as may be preferred. The outside can be stained and polished or varnished, if oak or fancy hardwood. In fact, almost any hardwood can be improved with an oak or walnut stain.

A Varnished Finish

Many of these cases are finished with a black stain, and clear varnished. A black finish has one advantage, it does certainly show up the specimens within better, perhaps, than any other treatment. While on the job, finish the beading as well, and number each piece in pencil to ensure correct fitting afterwards.

Now cut the glass panels for front and ends. The end ones can then be fitted in with their respective beading. Use thin nails and hammer them in lightly. Then arrange the stuffed specimens to satisfaction and glass and bead in the front, and touch up any hammer marks with varnish.

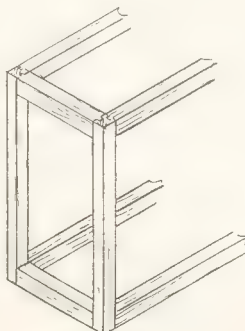


Fig. 1—Carcase of case

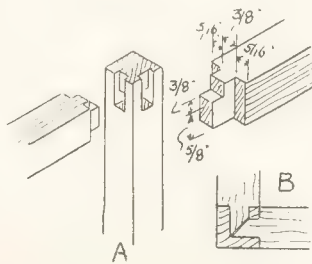


Fig. 2—Details of corner joints

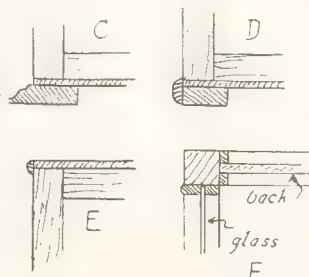


Fig. 3—Base and cover joints

A PHOTOGRAPHIC ALPHABET

More helpful hints in our practical series. Points the beginner and amateur should know. Look out for further pages.

G for—

GASLIGHT PAPER

THERE are broadly two types of developing printing paper as far as the amateur is concerned, i.e., paper which looks just the same after it has been exposed behind a negative and which has to be put into 'developer' to get the picture to appear.

The two types are Bromide and Gaslight. Bromide is very fast (sensitive to light) and only requires an exposure of a fraction of a second, but 'gaslight' is

'glossy paper' (which really is quite dull when allowed to dry naturally). After a good washing they are placed as quickly as possible, face down on the polished surface. A sheet of clean blotting paper is placed on top and the prints are pressed into good contact by running a squeegee across if possible—a round ruler will also do the work, as will a steady pull across with a flat ruler.

The sheet is now put on one side to dry, when the prints will peel off with a high gloss. Should prints stick, there has been grease on the plate. Stuck prints may be saved by re-soaking.

GRAIN

THIS is a word we are hearing quite a lot about in photography at the moment, especially in connection with miniature work. Every photograph is made up of thousands of tiny particles of a silver salt embedded in a binding

Any Interesting Photos?

THE Editor is always pleased to see—and pay for—photographs of outstanding or unusual pieces of work, or novel displays where there craft was exhibited. Such prints must be clear and sharp, and be sent with a note about the matter which will be of interest to other readers. Such prints will be returned at once or as soon as possible after publication in these pages.

material. Generally these particles cannot be detected with the naked eye, but under certain conditions, as, say, when a very big enlargement is made, they do appear and the result is said to be 'grainy' or 'show grain'.

Grain has to be guarded against with small-sized cameras on account of the subsequent enlarging, and this is generally done by using a special 'fine-grain' developer which keeps the particles small and well knit together.

In any sized camera under-exposing and over-developing will cause 'grain'. Films have improved a lot in texture during recent years and most of the standard rolls are made with a very fine-grain emulsion to start with, which reduces greatly the danger of after handling, making component particles too obtrusive.

H for—

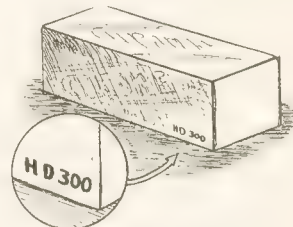
H AND D NUMBERS

ON many film cartons and boxes of plates you will see an inscription such as 'H and D 200' or 'H and D 250'. These show the 'speed' of the material,

or the degree in which it is sensitive to light.

There are several systems of showing speed, but this one was worked out by two scientists—Hunter and Driffield—and is the one most commonly used by English manufacturers, although the Continental speed indications are often added.

At first it is somewhat impossible for an amateur to appreciate just what



The HD number on the box

speed a certain H and D number represents in sensitivity, but once, by trying out a film, this knowledge is obtained, then all other films can be judged from it, for the speed increases in proportion to the number. Thus an H and D 500 film is twice as fast as an H and D 250 product.

It is worth while to get to understand the H and D system of speed rating as soon as possible, for it tells you whether the materials you buy are suitable for your purpose.

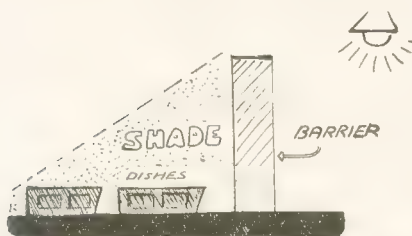
HYPO

THIS is the popular name for hyposulphite of sodium which is used throughout photography as a 'fixing' agent, i.e., for making films and printing papers no longer sensitive to light. With plates, films, gaslight and bromide papers it is used after development and with 'printing-out' paper (P.O.P.) after the picture has been made by putting paper and negative out in the sun.

Hypo is the cheapest chemical used in photography, a few pence buying a half-pound packet. It should, therefore, never be over-worked, a fresh 'bath' being made for each batch of plates or prints. Over-worked hypo can cause stains, in any case an old solution never gives the bright clean finish of one newly mixed.

The average strength of a hypo bath is 4ozs. of crystals to 1 pint of water, but can be used stronger or weaker without any ill effects.

Great care must always be taken to keep drops of hypo from entering other solution as its effect in most cases is to stop action. Even if hypo is spilt on to the bench it should be wiped up at once as, the water evaporating, a fine powder is left which can easily blow into unwanted places.



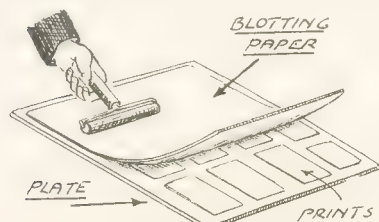
Working behind a light barrier making shade slow and can be used in an ordinary room if the light does not shine directly on the surface while it is being developed.

Gaslight paper is easy to use and can be bought at any dealers in various grades such as vigorous (for thin negatives), soft (for hard negatives) and normal, also in different surfaces like glossy, velvet and matte.

The paper is placed behind the negative in a frame and held out to the light (not necessarily gaslight) for a predetermined time (generally found by tests). It is then put in the developer (bought by the packet for a few coppers) and finally 'fixed' in hypo and well washed.

GLAZING

THAT very high gloss you find on some prints is put on by a simple method which costs nothing. Required is a sheet of glass, or one of stainless steel or chromium. In any case, the surface must be absolutely free from grease—glass needs particularly special



How to glaze prints

care to get the scrupulous cleanliness necessary—the metal plates clean much easier.

The prints to be treated must be on a

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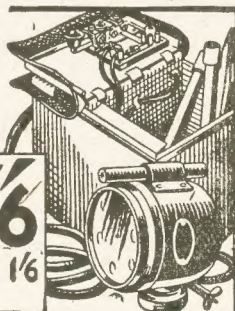
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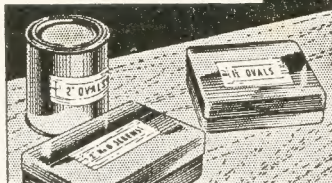


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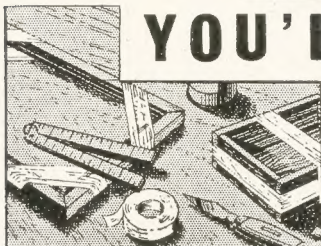
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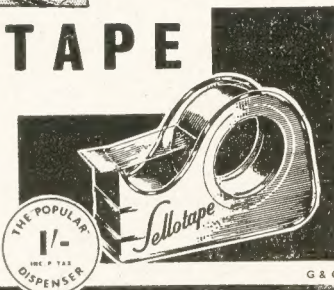
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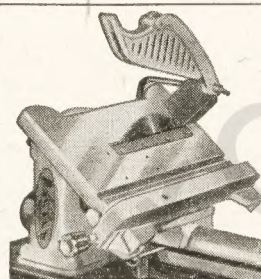
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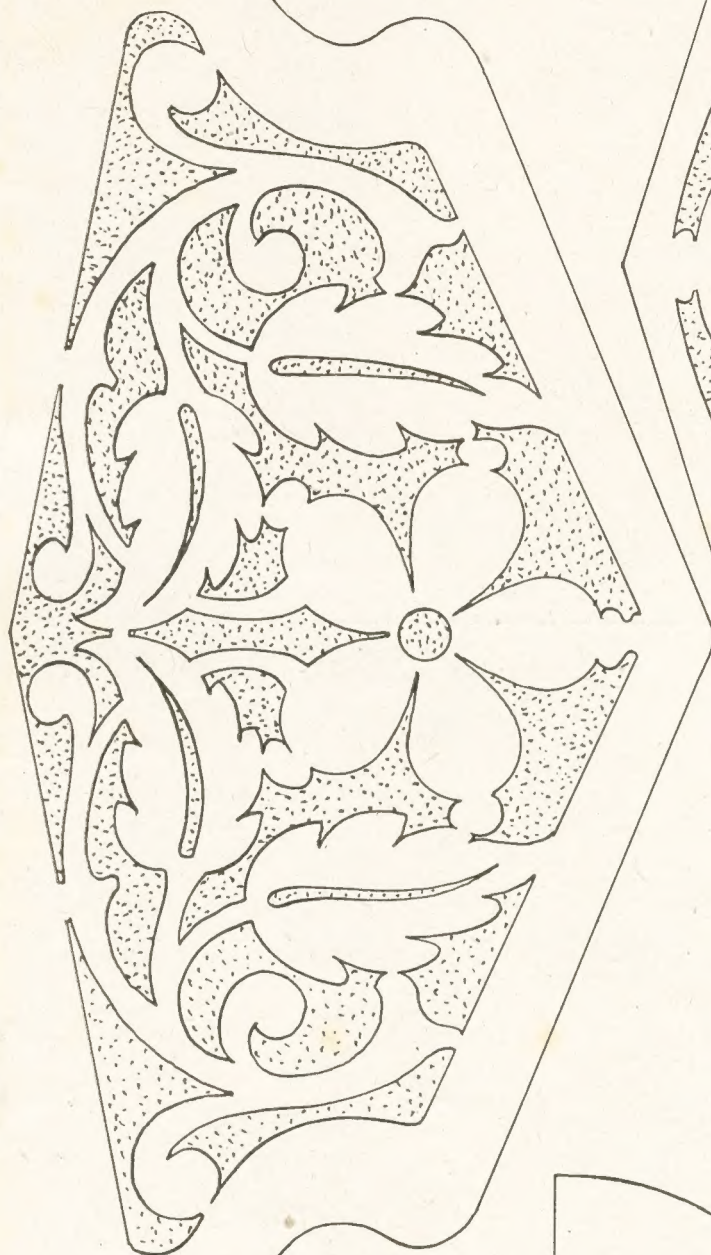
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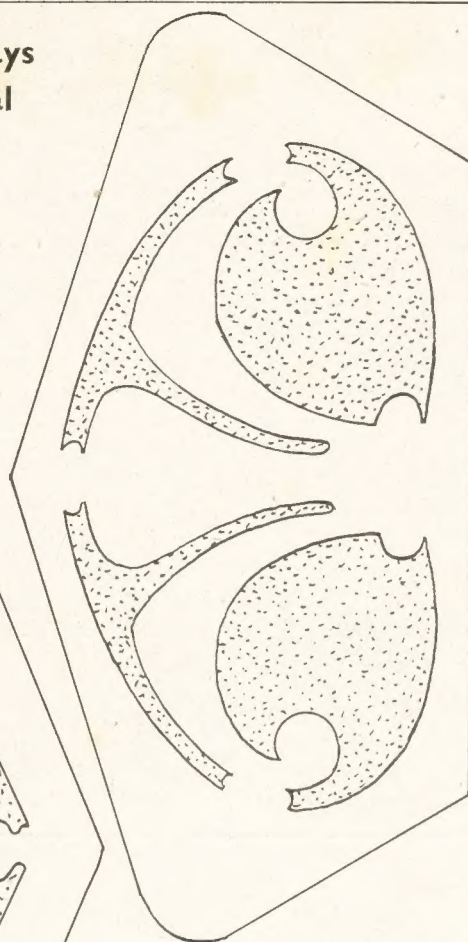
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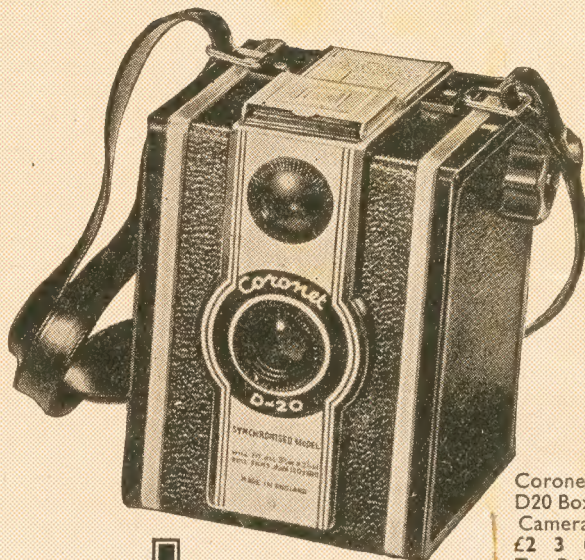
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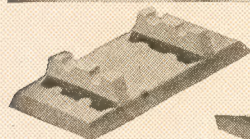
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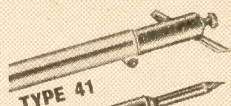
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